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Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

# UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

## APPLICATION ELEMENTS

See MPEP Chapter 600 concerning utility patent application contents

1.  Fee transmittal Form  
(Submit an original and a duplicate for fee processing)
2.  Applicant claims small entity status  
See 37 CFR 1.27.
3.  Specification [Total Pages 11] (preferred arrangement set forth below)
  - Descriptive title of the invention
  - Cross References to Related Applications
  - Statement Regarding Fed Sponsored R&D
  - Reference to sequence listing, a table, or a computer program listing appendix
  - Background of the Invention
  - Brief Summary of the Invention
  - Brief Description of the Drawings (if filed)
  - Detailed Description
  - Claim(s)
  - Abstract of the Disclosure
4.  Drawing(s) (35 USC 113) [Total Sheets 1]
5. Oath or Declaration [Total Pages 3]
  - a.  Newly executed (original or copy)
  - b.  Copy from prior Application (37 CFR 1.63(d))
    - i.  DELETION OF INVENTOR(S)  
Signed Statement attached deleting inventor(s) named in prior application, see 37 CFR 1.63(d)(2) and 1.63(h).
6.  Application Data Sheet. Se 37 CFR 1.76

ADDRESS TO: Commissioner for Patents  
Box Patent Application  
Washington, D.C. 20231

7.  CD-ROM or CD-R in duplicate, large table Computer Program (Appendix)
8. Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)
  - a.  Computer Readable Form (CRF)  
*Specification Sequence Listing on*  
 CD-ROM or CD-R (2 Copies); or  
 paper
  - c.  Statements verifying identity of above copies

## ACCOMPANYING APPLICATION PARTS

9.  Assignment Papers (cover sheet & documents)
10.  37 CFR 3.73(b) Statement  Power of Attorney  
(where there is an assignee)
11.  English Translation Document (if applicable)
12.  Information Disclosure Statement (IDS)/PTO-1449  Copies of IDS Citations
13.  Preliminary Amendment
14.  Return receipt postcard (MPEP 503)  
*(Should be specifically itemized)*
15.  Certified copy of priority Document(s)  
*if foreign priority is claimed*
16.  Other:

17. If a CONTINUATING APPLICATION, check appropriate box and supply the requisite information: and in a preliminary amendment or in an Application Data Sheet under 37 CFR 1.76

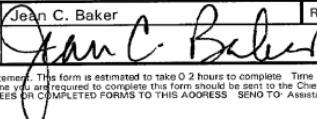
Continuation     Divisional     Continuation-in-part (CIP)    of prior application no. \_\_\_\_\_  
Prior application information: Examiner: \_\_\_\_\_

For CONTINUATION OR DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 5b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

## 18. CORRESPONDENCE ADDRESS

Customer Number or Bar Code Label (Insert Customer No. or Attach bar code label here) or  Correspondence address below

NAME	Jean C. Baker			
ADDRESS	Quarles and Brady LLP			
CITY	Milwaukee	STATE	Wisconsin	ZIP CODE
COUNTRY	USA	TELEPHONE		FAX (414) 271-3552

Name	Jean C. Baker	Registration No. (Attorney/Agent)	35,433
Signature			Date: September 25, 2000

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**FEE TRANSMITTAL****for FY 2000**

Patent fees are subject to annual revision.

Small Entity payments must be supported by a small entity statement otherwise large entity fees must be paid. See Forms PTO/SB/09-12  
See 37 C.F.R. §§1.27 and 1.28

TOTAL AMOUNT OF PAYMENT \$690.00

**Complete if Known**

Application Number	
Filing Date	September 25, 2000
First Named Inventor	Joel T. Dulebohn
Group Art Unit	
Examiner Name	
Attorney Docket Number	660336.90918

**METHOD OF PAYMENT (check one)**1.  The Commissioner is hereby authorized to charge indicated fees and credit any over payments to:

Deposit Account Number

17-0055

Deposit Account Name

Quarles &amp; Brady LLP

Charge Any Additional Fee Required  
Under 37 CFR 1.16 and 1.172.  Payment Enclosed:

Check

Money

Order

Other

**FEES CALCULATION****1. BASIC FILING FEE**

Large Entity Fee Code	Small Entity Fee Code	Fee (\$)	Fee Description	Fee Paid
101	690	201	345	Utility filing fee \$690.00
106	310	206	155	Design filing fee
107	480	207	240	Plant filing fee
108	690	208	345	Reissue filing fee
114	150	214	75	Provisional filing fee

SUBTOTAL (1) (\$690.00)

**2. CLAIMS**

Total Claims	Independent	Extra	Fee from below	Fee Paid
13	1	-2**=	0	X 0 = 0
		-3**=	0	X 0 = 0

Multiple Dependent Claims

\*\* or number previously paid, if greater. For reissues see below

Large Entity Fee Code	Small Entity Fee Code	Fee (\$)	Fee Description
103	18	203	9
102	78	202	39
104	260	204	130
109	78	209	39
110	18	210	9

SUBTOTAL (2) (\$ 0)

**FEES CALCULATION (continued)****3. ADDITIONAL FEES**

Large Entity Fee Code	Small Entity Fee Code	Fee (\$)	Fee Description	Fee Paid
105	130	205	65 Surcharge - late filing fee or oath	
127	50	227	25 Surcharge - late provisional filing fee or cover sheet	
139	130	139	130 Non-English specification	
147	2,520	147	2,520 For filing a request for reexamination	
112	920	112	920 Requesting publication of SIR prior to Examiner action	
113	1,840	113	1,840 Requesting publication of SIR after Examiner action	
115	110	215	55 Extension for reply within first month	
116	380	216	190 Extension for reply within second month	
117	870	217	435 Extension for reply within third month	
118	1,360	218	680 Extension for reply within fourth month	
128	1,850	228	925 Extension for reply within fifth month	
119	300	219	150 Notice of Appeal	
120	300	220	150 Filing a brief in support of an appeal	
121	260	221	130 Request for oral hearing	
138	1,510	138	1,510 Petition to institute a public use proceeding	
140	110	240	55 Petition to revive unavoidably abandoned application	
141	1,210	241	605 Petition to revive unintentionally abandoned application	
142	1,210	242	605 Utility issue fee (or reissue)	
143	430	243	215 Design issue fee	
144	580	244	290 Plant issue fee	
122	130	122	130 Petitions to the Commissioner	
123	50	123	50 Petitions related to provisional applications	
126	240	126	240 Submission of Information Disclosure Stmt	
581	40	581	40 Recording each patent assignment per property (times number of properties)	
146	690	246	345 Filing a submission after final rejection (37 CFR 1.129(a))	
149	690	249	345 For each additional invention to be examined (37 CFR 1.129(b))	
Other fee (specify)				
Other fee (specify) _				
Reduced by Basic Filing Fee Paid				SUBTOTAL (3) (\$)

**SUBMITTED BY****Complete (if applicable)**

Typed or Printed Name	Jean C. Baker	Registration No. (Attorney/Agent)	35,433	Telephone	(414) 277-5709
Signature				Date	September 25, 2000

METHOD FOR PREVENTING PHOTOOXIDATION OR AIR OXIDATION IN  
FOOD, PHARMACEUTICALS AND PLASTICS

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims priority over provisional patent application U.S. Serial No. 60/156,130, filed September 27, 1999.

5 STATEMENT REGARDING FEDERALLY SPONSORED  
RESEARCH OR DEVELOPMENT

Not applicable.

BACKGROUND OF THE INVENTION

Milk, chocolate, butter, and other foods, when exposed to light, such as sunlight or fluorescent light, may develop a characteristic off-flavor caused by photooxidation or air oxidation. This tendency to develop an off-flavor significantly reduces the shelf-life of foods susceptible to photooxidation or air oxidation. Photooxidation or air oxidation can also cause plastics to develop undesired characteristics over time, and reduce the stability of pharmaceuticals.

15 There is a need in the food, plastics, and pharmaceutical industries for a method of reducing photooxidation or air oxidation in susceptible materials.

BRIEF SUMMARY OF THE INVENTION

The present invention includes a method for reducing photooxidation or air oxidation in susceptible materials, such as foods, plastics, and pharmaceuticals, comprising the step of mixing with the material an anti-photooxidation composition comprising at least one amino acid and at least one metal ion, the composition added in an amount sufficient to reduce photooxidation or air relative to a photooxidation- or air oxidation-susceptible

material lacking the anti-photooxidation composition. Preferably, the anti-photooxidation composition further comprises at least one organic acid.

Other features, objects and advantages of the present invention will become apparent to one of skill in the art after review of the specification and

5 claims.

#### BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

Not applicable.

#### DETAILED DESCRIPTION OF THE INVENTION

As described in the examples below, adding an antioxidation

10 composition comprising a carboxylic acid, a metal ion, and a compound comprising an amino acid or an amino acid moiety (hereinafter referred to as an "amino acid compound" to products, such as foods, plastics and pharmaceuticals (preferably milk or white chocolate), prevents the formation of an off flavor caused by photooxidation or air oxidation of these foods.

15 By an "amino acid compound" it is meant an amino acid, polypeptide or protein.

By "antioxidation composition" as it is used herein, it is meant a composition that reduces the adverse effects of photooxidation or air oxidation when incorporated into a material that is susceptible to

20 photooxidation or air oxidation.

In another embodiment, an antioxidant composition comprising an amino acid compound and a metal oxide, such as aspartate and MgO, which are capable of forming a light-absorbing complex, is used to prevent photooxidation or air oxidation in a food or other material susceptible to such

25 oxidation. An example of a composition having at least one metal ion and at

least one amino acid that we predict will be suitable for preventing photooxidation or air oxidation is provided below.

The examples below show that the method of the invention prevents photooxidation and air oxidation in foods susceptible to such oxidation. We

5 expect that the method of the invention can also be used in pharmaceuticals and plastic to prevent the adverse effects caused by these types of oxidation.

As described in the examples below, the amino acid compound, carboxylic acid and metal ion may be formulated as an antioxidation composition that is added to photooxidation or air oxidation susceptible

10 material. One of ordinary skill in the art would appreciate that although these components may most conveniently be added as a stabilizing composition, one could also add these components separately to the susceptible material.

In the examples below, lysine was used as the amino acid to promote prevent photooxidation or air oxidation. It is expected that either D-lysine or

15 L-lysine may be used in the practice of the present invention. It is also expected that any amino acid may be used in the practice of the invention. It is reasonably expected that polypeptides and proteins may also be used together with a metal ion, or a metal ion and a carboxylic acid, to prevent photooxidation or air oxidation.

20 Malic acid and citric acid were used in the examples below to prevent photooxidation or air oxidation. It is expected that other carboxylic acids including mono, di, tri, and polycarboxylic acids may work equally well. It is also expected that carboxylic acids containing additional functional groups such as  $NH_2^-$ ,  $OH^-$ ,  $PO_4^{-3}$ , and  $SO_4^{-2}$  would work as well.

25 In the examples, below magnesium, magnesium and calcium, or magnesium, calcium and zinc were tested and were found to be suitable metal ions in the practice of the present invention. Other metal ions are

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expected to work as well, including group IA, group IIA, Ti, V, Cr, Mn, Co, Ni, Cu, Zn, Se, Fe, Mo, Sn, and Au.

The molar ratio of the metal ion to amino acid compound to carboxylic acid may vary depending upon the application. The molar ratio of the amino acid compound to the metal ion may vary from about 0.01 to about 20 when the amino acid compound is an amino acid monomer. The carboxylic acid to metal ion molar ratio can vary from about 0.01 to about 20. Preferably the molar ratio of the amino acid to metal ion varies from about 0.1 to about 4, and the molar ratio of carboxylic acid to metal ion varies from about 0.1 to about 4. Preferably a suitable antioxidation composition comprises at least one amino acid compound, at least one carboxylic acid and at least one metal ion, and has a pH in the range of 3 to 8.

In another embodiment of the present invention, the composition also reduces color fading in materials selected from the group consisting of food, plastics, flowers and paper. One cause of color fading is due to UV light interaction with the dyes and pigments comprising functional groups such as alcohol, ester, aldehyde, ketones, ether, and carboxylic acid resulting in breakdown of the dye and pigment color. The compositions of amino acid, metal and organic acid can reduce and/or prevent the breakdown of dye or pigment color by two methods. In one method, the composition adsorbs UV light that can interact with the dye and pigment and emit white light. This absorption will prevent the UV light from interaction with the functional groups of the dyes or pigments. In the second method, the functional groups and metals of the composition can stabilize the functional groups of the dyes and pigment by forming chelated bonds and/or hydrogen bonds. This will help prevent UV light from breaking down the dyes and pigments.

The composition can be blended or applied to the surface of a product, such as food, plastic flowers, and paper, to reduce and/or prevent the UV

light from interacting with the dyes and pigments. We usually observed that the fading of the material comprising the composition of amino acid, metal and organic acid to be less than the fading of untreated material without the composition.

5 In another embodiment of the present invention, the composition also reduces degradation of a substance selected from the group consisting of caffeine, vitamins (preferably pyridoxine, riboflavin, vitamin D, niacin, phylloquinone), folic acid, isoflavones, licorice, ginkgo, garlic, beta-carotene, peppermint, herbal extract, botanicals, peppermint, herbal extract, botanicals, 10 natural and artificial flavors. The materials described above have functional groups such as alcohol, ester, aldehyde, ketones, ether, and carboxylic acid, that can interact with metal and functional groups of the composition of amino acid, metal and organic acid. Some of the interaction are hydrogen bonding and chelation. Drinks were prepared with vitamins and flavor with and without 15 the composition of amino acid, metal and organic acid. The drinks were pasteurized. The drinks were then taste tested, and the drinks with the composition had an overall better taste.

In preferred embodiment, the product is milk or white chocolate and the level of the composition is between 0.001% and 2% w/w (Note: all 20 percentage concentrations are w/w).

In a most preferred embodiment, the product is milk, the range is 0.01% to 0.5%, and the composition is 65% solid solution of lysine:mg:malic:citic with a molar ratio of 1.49:1.2:16:0.72.

25 In another embodiment, the product is white chocolate, the range is from 0.1% to 0.5%, and the composition is lysine:ca:malic:citic with a molar ratio of 1.49:1:2.16:0.72, which is a crème.

In another embodiment, the product is plastic and the level of the composition is from 0.001% to 5%, preferably 0.01% to 2%.

The following non-limiting examples are intended to be purely illustrative.

## EXAMPLES

### Preparation of antioxidation compositions

5        The following are examples of antioxidation compositions that may be used to protect products, such as food, pharmaceuticals, and plastics, against photooxidation or air oxidation.

#### Composition A

10      160 g water  
          110 g lysine HOH (0.67 moles)  
          40 g MgO (0.99 moles)  
          130 g malic acid (0.97 moles)  
          62 g citric acid (0.32 moles)

15      The pH of the solution varies from 4.4 to 4.8 and is approximately 65% solid solution.

#### Composition B

20      157 g water  
          110 g lysine HOH (0.67 moles)  
          10 g CaO (0.18 moles)  
          18 g MgO (0.45 moles)  
          100 g malic acid (0.75 moles)  
          73 g citric acid (0.38 moles)

25      The pH of the solution varies from 3.9 to 4.3 and is approximately 65% solid solution.

#### Composition C

30      166.4 g water  
          143 g lysine HOH (0.87 moles)  
          13 g CaO (0.23 moles)  
          13 g MgO (0.32 moles)  
          13 g ZnO (0.16 moles)  
          122.2 g malic acid (0.91 moles)  
          58.5 g citric acid (0.30 moles)

35      The pH of the solution varies from 4.2 to 4.6 and is approximately 65% solid solution.

#### Composition D

          1571.5 g water  
          1155.1 g lysine HOH (7.03 moles)  
          189.1 g MgO (4.69 moles)

1365.1 g malic acid (10.18 moles)  
654.6 g citric acid (3.41 moles)

The pH of the solution varies from 3.6 to 4.0 and is approximately 65% solid solution.

5           Composition E  
10 g water  
10 g lysine HOH (0.061 moles)  
40 g MgO (0.060 moles)  
7.2 g succinic acid (0.061 moles)

10          The pH of the solution varies from 8 to 9.

Composition F  
15 g water  
8.2 g DL-aspartic acid (0.062 moles)  
2.5 g MgO (0.062 moles)

15          Compositions A-F may be used as a liquid as prepared, or may be used as a solid after drying by any suitable means, including, for example, microwave, spray dried, drum dried, and any other feasible process, such as fluid bed agglomeration and cooker extrusion.

Evaluation of milk stability after exposure to light

20          The following samples were prepared, exposed to light and evaluated as described below.

Control

A 200-ml aliquot of whole milk in a clear container wrapped in aluminum foil.

25          Sample 1

A 200-ml aliquot of whole milk in a clear container.

Sample 2

A 200-ml aliquot of whole milk and 2 grams of composition B.

30          The control and test samples were exposed for two hours and 10 minutes to a Sylvania Superflood light (blue bulb) placed at a distance of 11 inches from the container. The control and test samples were evaluated by tasting.

No off-flavor was noted in the control. Sample one had an off taste, similar to that of sour milk. Sample two tasted comparable to the control.

Evaluation of white chocolate stability after exposure to light

The following samples were prepared, exposed to fluorescent light and  
5 evaluated as described below.

Control

White chocolate not exposed to light

Sample 1

White chocolate exposed to light

10 Sample 2

White chocolate blended with composition A (0.2% w/w) and exposed  
to light

Sample 3

White chocolate blended with composition B (0.2% w/w) and exposed

15 to light

Sample 4

White chocolate blended with composition C (0.2% w/w) and exposed  
to light

Sample 5

20 White chocolate blended with composition D (0.2% w/w) and exposed  
to light

Each sample was exposed to light for several hours to days and  
sampled periodically for taste tests. The chocolate comprising anti-  
photooxidation composition A, B, C, or D had a flavor comparable to the  
25 control, whereas the untreated white chocolate (sample A) had an off flavor.  
Sample C, which comprises composition B, had a flavor closest to the control.

CLAIMS

We claim:

1. A method of reducing photooxidation or air oxidation in a product comprising the step of dispersing within the product an antioxidation composition comprising at least one amino acid, at least one metal ion, and at least one organic acid, the composition added in an amount sufficient to reduce photooxidation relative to a photooxidation-susceptible or air oxidation-susceptible material lacking the anti-oxidation composition.
2. The method of claim 1 in which the molar ratio of the amino acid compound to the metal ion is between 0.01 and 20.
3. The method of claim 1 in which the carboxylic acid to metal ion molar ratio is between 0.01 and 20.
4. The method of claim 2 wherein the molar ratio of the amino acid to metal ion is between 0.1 and 4.
5. The method of claim 2 wherein the molar ratio of carboxylic acid to metal ion is between 0.1 and 4.
6. The method of claim 1 wherein the composition also reduces color fading in materials selected from the group consisting of food, plastics, flowers and paper.
7. The method of claim 1 wherein the composition also reduces degradation of a substance selected from the group consisting of caffeine,

vitamins, folic acid, isoflavones, licorice, ginkgo, garlic, beta-carotene, peppermint, herbal extract, botanicals, natural and artificial flavors.

8. The method of claim 1, wherein the product is milk and wherein the level of the composition is between 0.001% and 2%.

9. The method of claim 8, wherein the range is 0.01% to 1.0% and wherein the composition is 65% solid solution of lysine:mg:malic:citic with a molar ratio of 1.49:1.2.16:0.72.

10. The method of claim 1, wherein the product is white chocolate and the level of the composition is 0.001% to 2%.

11. The method of claim 10, wherein the range is from 0.1% to 0.5% and wherein the composition is cream of lysine:ca:malic:citic with a molar ratio of 1.49:1.2.16:0.72.

12. The method of claim 1, wherein the product is plastic and the level of the composition is from 0.001% to 5%.

13. The method of claim 12, wherein the range is between 0.01% and 2%.

## ABSTRACT OF THE DISCLOSURE

Disclosed is a method of reducing photooxidation or air oxidation in susceptible materials such as food, plastics or pharmaceuticals comprising mixing the material with an antioxidation composition comprising at least one amino acid, at least one metal ion, and at least one carboxylic acid in an amount effective to reduce photooxidation in the material.

Please type a plus sign (+) inside this box Q010/PTO  
Rev. 8/95U.S. Department of Commerce  
Patent and Trademark Office

**DECLARATION FOR  
UTILITY OR DESIGN  
PATENT APPLICATION**

Declaration  
Submitted  
with Initial Filing

OR

 Declaration  
Submitted after  
Initial Filing

Attorney Docket Number	660336.90918
First Named Inventor	Joel I. Dulebohn
<b>COMPLETE IF KNOWN</b>	
Application Number	
Filing Date	September 25, 2000
Group Art Unit	
Examiner Name	

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe that I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

**METHOD FOR PREVENTING PHOTOOXIDATION OR AIR OXIDATION IN FOOD,  
PHARMACEUTICALS AND PLASTICS**

(Title of the Invention)

the specification of which

 is attached hereto

OR

 was filed on (MM/DD/YYYY)  as United States Application Number or PCT InternationalApplication Number  and was amended on (MM/DD/YYYY)  (if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations 11.66

I hereby claim foreign priority benefits under Title 35, United States Code §119(a)-(d) or §365(b) of any foreign application(s) for patent or inventor's certificate or §365(e) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached? YES	Certified Copy Attached? NO
n/a			<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

 Additional foreign applications numbers are listed on a supplemental priority sheet attached hereto:

I hereby claim the benefit under Title 35, United States Code §119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)	Additional provisional application numbers are listed on a supplemental priority sheet attached hereto.
60/156,130	September 27, 1999	<input type="checkbox"/>

**Burden Hour Statement:** The form is estimated to take .4 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

**DECLARATION**

Page 2

I hereby claim benefit under Title 35, United States Code §120 of any United States application(s), or §365(C) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application has not disclosed in a prior United States application or PCT international application, I hereby make a declaration in accordance with paragraph 37, Title 35, United States Code §12, I acknowledge the duty to disclose information which would impair patentability as defined in Title 37, Code of Federal Regulations §1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.

U.S. Parent Application Number	PCT Parent Number	Parent Filing Date (MM/DD/YYYY)	Parent Patent Number (if applicable)
n/a			

Additional U.S. or PCT international application numbers are listed on a supplemental priority sheet attached hereto

As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and all continuation and divisional applications based thereon, and to transact all business in the Patent and Trademark Office connected therewith:

Firm Name  Customer or label  Number  
**OR**

List attorney(s) and/or agent(s) name and registration number below

Name	Registration Number	Name	Registration Number
Thomas W. Ehrmann	20,374	Jean C. Baker	35,433
Herbert W. Mylius	24,578	David G. Ryser	36,407
Barry E. Sammons	25,608	Bennett J. Berson	37,094
Nicholas J. Seay	27,386	Michael A. Jaskolski	37,551
George E. Haas	27,642	Richard T. Roche	38,599
Harvey D. Fried	28,298	John T. Pienkos	42,997
Michael J. McGovern	28,326	Daniel G. Radler	43,028
Carl R. Schwartz	29,437	Gregory M. Smith	43,136
Keith M. Baxter	31,233	Steven J. Wietrzny	44,402
John D. Franzini	31,356	David M. Kettner	45,589
		Adam Forman	P46,707

Additional attorney(s) and/or agents named on a supplemental priority sheet attached hereto

Please direct all correspondence to  Customer Number or label  OR  Fill in correspondence address below

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**City** Milwaukee **State** WI **Zip** 53202-4497  
**Country** USA **Telephone** (414) 277-5709 **Fax** (414) 271-3552

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

**Name of Sole or First Inventor:**  A petition has been filed for this unsigned inventor

Given Name	Joel	Middle Initial	I.	Family Name	Dulebohn	Suffix e.g. Jr.
Inventor's Signature						Date

Residence: City Lansing State MI Country USA Citizenship USA

Post Office Address 3510 West Saginaw

Post Office Address

City	Lansing	State	MI	Zip	48917	Country	USA	Applicant Authority
------	---------	-------	----	-----	-------	---------	-----	---------------------

Additional inventors are being named on supplemental sheet(s) attached hereto

Please type a plus sign (+) inside this box

DECLARATION					ADDITIONAL INVENTOR(S) Supplemental Sheet						
Name of Additional Joint Inventor, if any					A petition has been filed for this unsigned inventor						
Given Name	Ronald	Middle Initial	J.	Family Name	Carlotti		Suffix e.g. Jr.				
Inventor's Signature						Date					
Residence: City		Grand Rapids			State	MI	Country	USA	Citizenship	USA	
Post Office Address		6921 Maple Crest Drive, S.E.									
Post Office Address											
City	Grand Rapids	State	MI	Zip	49546	Country	USA	Applicant Authority			
Name of Additional Joint Inventor, if any					A petition has been filed for this unsigned inventor						
Given Name				Middle Initial	Family Name				Suffix e.g. Jr.		
Inventor's Signature						Date					
Residence: City					State	Country		Citizenship			
Post Office Address											
Post Office Address											
City		State	Zip		Country				Applicant Authority		
Name of Additional Joint Inventor, if any					A petition has been filed for this unsigned inventor						
Given Name				Middle Initial	Family Name				Suffix e.g. Jr.		
Inventor's Signature						Date					
Residence: City					State	Country		Citizenship			
Post Office Address											
Post Office Address											
City		State	Zip		Country				Applicant Authority		
Name of Additional Joint Inventor, if any					A petition has been filed for this unsigned inventor						
Given Name				Middle Initial	Family Name				Suffix e.g. Jr.		
Inventor's Signature						Date					
Residence: City					State	Country		Citizenship			
Post Office Address											
Post Office Address											
City		State	Zip		Country				Applicant Authority		
	Additional inventors are being named on supplemental sheet(s) attached hereto										